Development of fish oil-loaded nano-microcapsules by co-axial electrospraying: physical characterization and oxidative stability

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Publication date:
2017

Document Version
Peer reviewed version

Development of fish oil-loaded nano-microcapsules by co-axial electrospraying: physical characterization and oxidative stability

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Electrospraying processing, which does not require the use of heat, is a promising technique for the encapsulation of thermo- and oxygen-sensitive bioactive compounds such as omega-3 polyunsaturated fatty acids (PUFA). The potential of single-needle electrospraying for the encapsulation of omega-3 PUFA has already been demonstrated when using proteins (e.g. zein, gelatin, soy protein isolate and whey protein concentrate) and polysaccharides (e.g. dextran) as wall materials. Nevertheless, the production of core-shell nano-microcapsules loaded with omega-3 PUFA by co-axial electrospraying, which can lead to a better lipid protection, remains to be explored.

Thus, this work aimed at investigating the development of fish oil-loaded nano-microcapsules by co-axial electrospraying using proteins (e.g. zein)-polysaccharides (e.g. pullulan) mixtures as wall materials. The nano-microcapsules obtained were characterized in terms of morphology, encapsulation efficiency and lipid distribution. Furthermore, the effect of incorporating natural antioxidants (e.g. δ-tocopherol) to the inner or outer layer of the core-shell capsules on their oxidative stability was assayed.